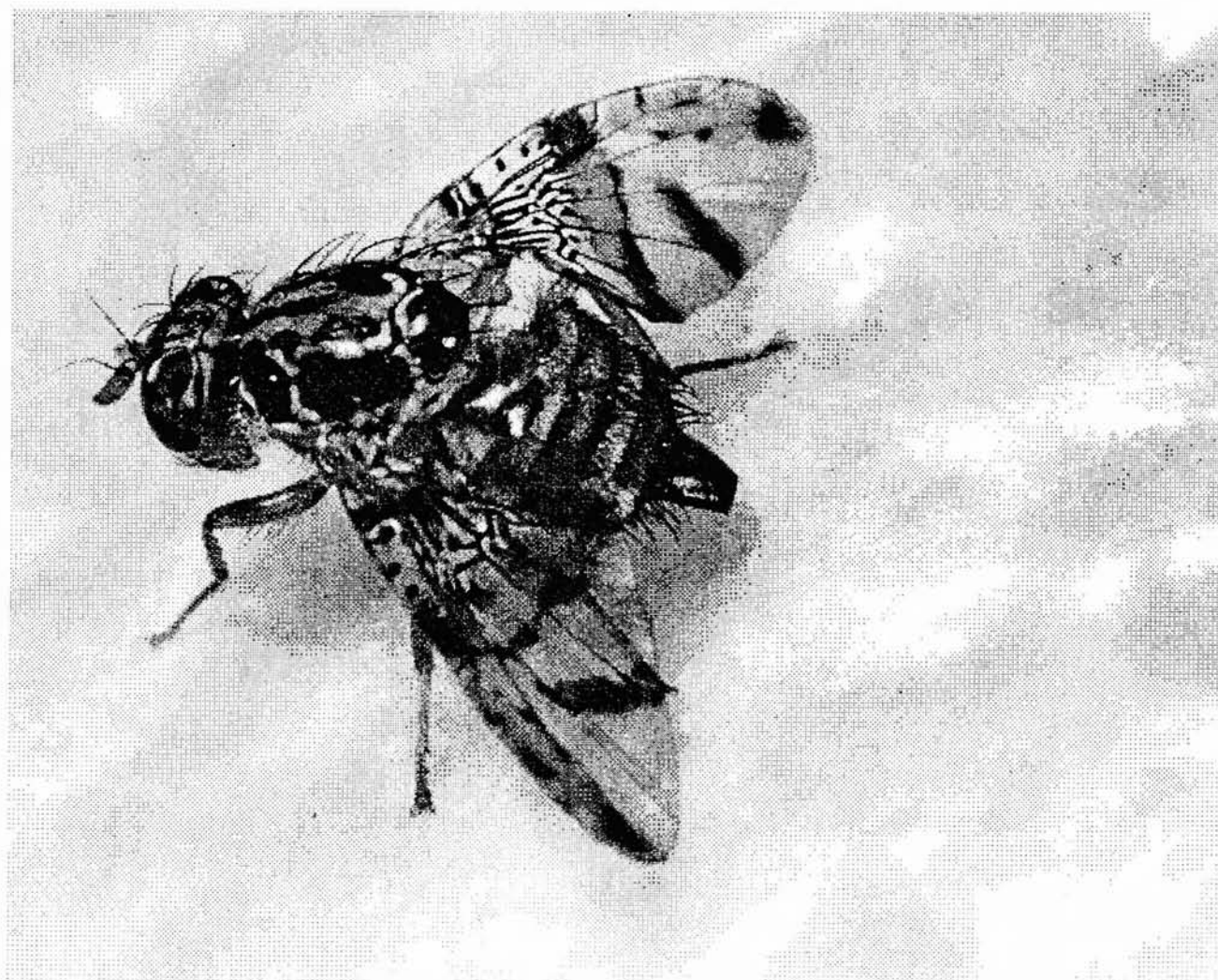
	<h1 style="text-align: center;">CALIFORNIA PLANT PEST and DISEASE REPORT</h1>	<p>What's Inside: Vol. 8 Numbers 5-6 September to December, 1989</p> <p>Entomology Highlights 85 Significant Finds 85 New State Records 101 New County Records . 101 Pest Exclusion 105 Significant Finds in Other States 106 Significant Finds in Other Countries 107 Border Stations 108 Botany Highlights 109 Plant Pathology Highlights.. 113</p>
<p>California Department of Food and Agriculture 1220 N Street, Sacramento, California 95814</p>		



Adult Mediterranean Fruit Fly, *Ceratitus capitata*, on an orange fruit. For information on California finds, see page 85. The illustration is a computer scanned image of an original photograph taken by Jim Heath, CDFA.

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California Plant Pest and Disease Report

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The editor acknowledges the contributions of numerous individuals within the department, without whose cooperation and assistance this project would not be possible.

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Entomology Highlights

NAME CHANGES

The Entomological Society of America (ESA) made a few more additions to the list of Common Names of Insects and Related Organisms for California Insects. The following names were submitted in May and June of 1989 and subsequently adopted by the Society:

European elm bark beetle
Scolytus multistriatus (Marsham)
Coleoptera: Scolytidae

western conifer-seed bug
Leptoglossus occidentalis Heidemann
Hemiptera: Coreidae

corn thrips
Frankliniella williamsi Hood
Thysanoptera: Thripidae

western blacklegged tick
Ixodes pacificus Cooley & Kohls
Acari: Ixodidae

western pine tip moth
Rhyacionia bushnelli (Busck)
Lepidoptera: Tortricidae

SIGNIFICANT FINDS

MEDITERRANEAN FRUIT FLY, *Ceratitis capitata* , -(A)- Multiple finds of wild Mediterranean fruit flies (Medflies) in two major, widely separated urban areas have resulted in an all-out eradication effort by CDFA, using sterile fly release and aerial spraying techniques. Medfly finds made in 1989 prior to the period of this report are listed in the previous issue of CPPDR [8(3-4):39-42]. The following charts outline the finds made since our last report. A map of the Medfly finds in the greater Los Angeles area is provided on page 92. The map illustrates the various localities where Medflies have been found since 1984. The symbols indicating find sites represent locations only, and do not account for multiple finds.

All areas of the greater Los Angeles metropolitan area in Los Angeles County and northern Orange County were trapped at a minimum of 10 Jackson traps per square mile. To improve our detection and delimiting capabilities, Federal, State, and County personnel are currently increasing the density of Medfly traps throughout the Los Angeles metropolitan area. Starting on December 4, Medfly traps were to be increased to a minimum of 25 traps per square mile over 1,100 square miles. This trapping density is used in all areas that are within 6-1/2 miles of a Medfly detection and in all gaps that exist between currently infested areas in Los Angeles County. In addition to the increase in trimedlure traps, all of these areas continue to be trapped with McPhail traps at a rate of five traps per square mile.

The following charts tabulate the specifics of each Medfly find:

Mediterranean Fruit Fly, *Ceratitis capitata*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Los Angeles	Valinda	9/19/89	0/1	McPhail	fig tree	C. Cabacungan
		9/26/89	1/0	Jackson	fig tree	D. Davis
	Baldwin Park	9/26/89	12/0	Jackson	orange tree	J. Hartman
	Whittier	9/26/89	1/0	Jackson	persimmon tree	J. Lopez
		9/26/89	0/1	McPhail	persimmon tree	J. Lopez
	Valinda	9/28/89	1/0	Jackson	lemon tree	A. Vingua
	Baldwin Park	9/29/89	1/0	Jackson	lemon tree	J. Hartman
	Whittier	9/29/89	49/3	Various	various	S. Bennett et al.
		9/30/89	Larva	1st/3rd instar	strawberry	guava L. Bronson
	Baldwin Park	10/1/89	1/0	Jackson	guava tree	E. Kheir
	Valinda	10/1/89	1/0	?	fig tree	F. Munchmeyer
	Whittier	10/1/89	7/1*	Various	various	D. Davis et al.
		10/2/89	Larva	1st/3rd instar	persimmon	L. Bronson
	* The female was mated with well-developed eggs.					
Los Angeles	Baldwin Park*	10/4/89	1/0	Jackson	orange tree	C. Cabacungan
	Whittier	10/4/89	6/0	Jackson	various	P. Davis/A. Lomeli
		10/4/89	Larva	?	persimmon	D. Penrose et al.
		10/4/89	Larva	?	orange	V. Kataja et al.
		10/6/89	1/0	Jackson	orange tree	D. Hodges
		10/6/89	Larva	?	orange/lemon	L. Bronson et al.
* Baldwin Park/Valinda find sites received aerial treatments of malathion on October 3 to 24. Whittier received bait spray treatment over the nine-square-mile infestation area.						
Los Angeles	Whittier	10/12/89	Larva	1-3rd instar	orange	L. Bronson et al.
		10/12/89	Larva	1-3rd instar	orange	T. London et al.
		10/13/89	Larva	5-3rd instar	lemon	A. Monterola et al.
	Bassett	10/13/89	1/0	McPhail	guava tree	E. Kheir

Mediterranean Fruit Fly, *Ceratitis capitata*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Los Angeles	Valinda	10/17/89	1/0	Steiner	fig tree	S. Souza
	Whittier	10/17/89	Larva	22-3rd instar	kumquat	A. Ruiz et al.
		10/18/89	Larva	1-3rd instar	fig	A. Shabazian et al.
		10/21/89	1/0*	N/A	garbage can	homeowner
* E. Fisher determined that the male Medfly was sexually mature.						
Los Angeles	San Fernando	10/25/89	1/0*	Jackson	guava tree	J. Camberos
* K. Corwin determined that the male Medfly was sexually mature.						
Los Angeles	Sylmar	10/31/89	0/1	McPhail	orange tree	S. Moulton
	Valinda*	10/31/89	1/0	Steiner	fig tree	S. Souza
	Whittier	10/31/89	0/1	Steiner	orange tree	P. Ermatinger
		10/31/89	1/0	Steiner	strawberry guava	P. Ermatinger
		11/1/89	Larva	6-3rd instar	orange	A. Davis / A. Ruiz
		11/1/89	1/0	Steiner	orange tree	P. Ermatinger
		11/1/89	1/0	Steiner	?	P. Ermatinger
		11/1/89	2/0	Steiner	fig tree	P. Ermatinger
* All Valinda and Whittier finds were within the West Covina/Baldwin Park and Whittier sterile Medfly release areas. Science Advisory Panel advised CDFA that this pattern of emergence is not unexpected since the infestation is still within the F ₁ generation.						
Los Angeles	San Fernando	11/1/89	1/0	Jackson	grapefruit tree	W. Diaz
	Sylmar*	11/5/89	1/0	Jackson	grapefruit tree	C. Cabacungan
* An aerial application of malation bait spray was applied the evening of November 6 over a 17-square-mile area around the Sylmar Medfly finds.						
Los Angeles	Rosemead	11/3/89	1/0	Steiner	?	E. Kheir et al.
		11/5/89	1/0	McPhail	apple tree	C. Cabacungan et al.
		11/6/89	1/0	Jackson	tangerine tree	J. Lopez et al.

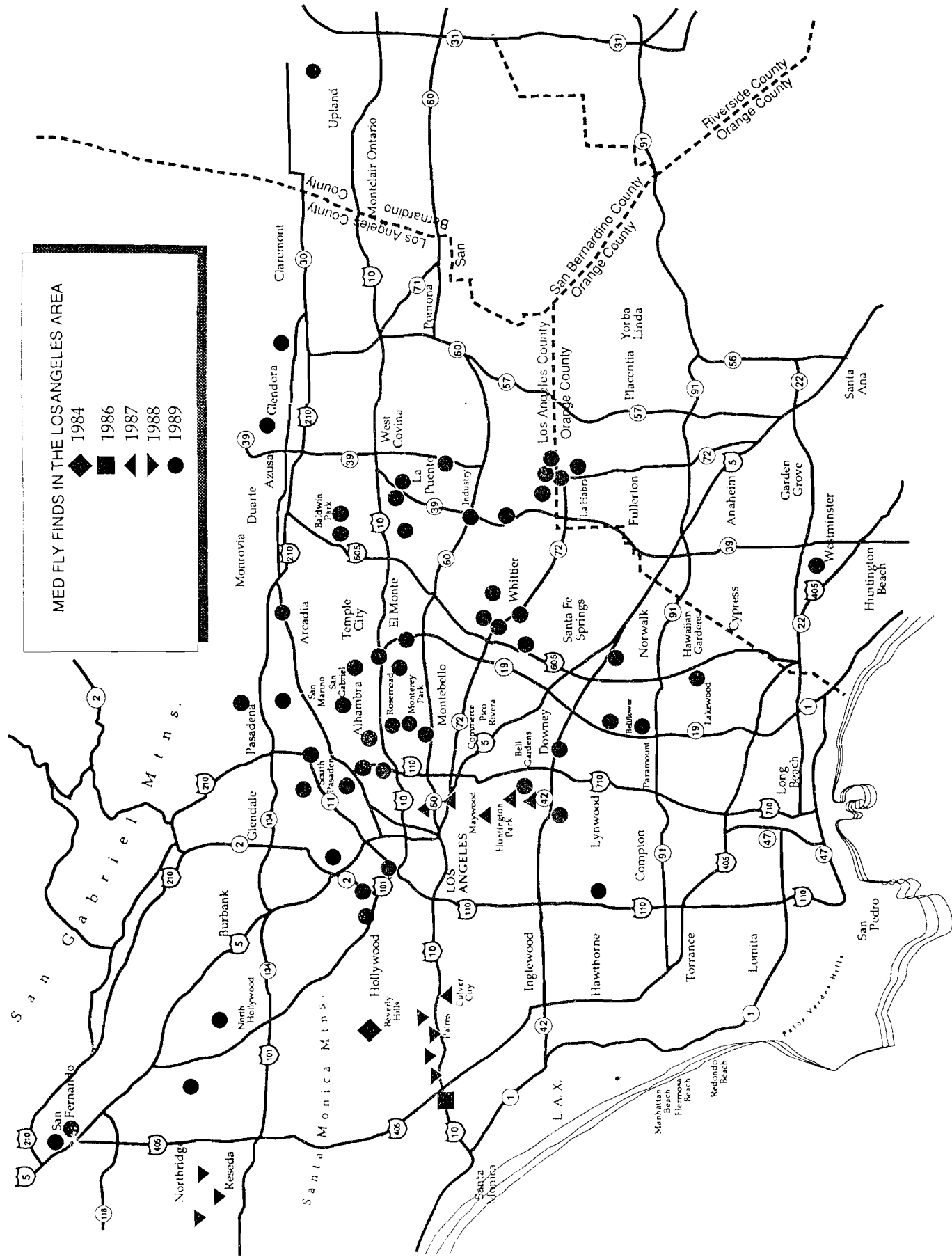
Mediterranean Fruit Fly, *Ceratitis capitata*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Los Angeles	San Gabriel	11/6/89	1/1	McPhail	persimmon tree	E. Kheir et al.
		11/8/89	2/0	Jackson	lemon/orange	A. Arila et al.
	Whittier	11/6/89	1/0	Steiner	orange tree	E. Sanchez et al.
		11/8/89	2/0	Steiner	lemon tree	P. Ermatinger.
		11/8/89	1/0	Steiner	strawberry guava	P. Ermatinger.
Los Angeles	Valinda	11/7/89	2/0	Steiner	lemon/orange	L. Kelley et al.
	South Pasadena	11/9/89	2/0	Jackson	guava/persim.	S. Bennett et al.
	North Hollywood	11/10/89	0/1	McPhail	fig tree	G. Sanchez
	San Gabriel*	11/10/89	1/0	Jackson	lemon tree	E. Ferre et al.
		11/12/89	1/0	Jackson	orange tree	R. Ferrer et al.
	Monterey Park*	11/10/89	1/0	Jackson	orange tree	A. Scott et al.
		11/11/89	1/0	Jackson	tangerine tree	P. Busatto et al.
	Rosemead*	11/10/89	2/0	Jackson	lemon/orange	M. Raindancer et al.
	* CDFA completed an aerial application of malathion bait spray over a 24-square-mile area on November 9.					
Los Angeles	Alhambra	11/11/89	1/0	Jackson	apple tree	P. Garcia et al.
	Hacienda Heights*	11/14/89	1/0	Steiner	nectarine tree	E. Sanchez
* The find site is at the edge of the aerial boundary for the West Covina/Baldwin Park and Whittier sterile Medfly release areas.						
Los Angeles	Whittier	11/13/89	1/0	Steiner	orange tree	E. Sanchez et al.
		11/13/89	1/0	Steiner	avocado tree	P. Ermatinger et al.
		11/13/89	3/0	Steiner	tangerine tree	A. Avila et al.
		11/14/89	2/0	Steiner	guava/lemon	P. Ermatinger
		11/14/89	0/1	Steiner	orange tree	A. Avila et al.
	San Gabriel	11/14/89	0/1	McPhail	guava tree	J. Vivas
	Valinda	11/14/89	2/0	Steiner	lemon/orange	A. Avila et al.
	Bellflower	11/15/89	1/0	McPhail	orange tree	K. Schober
	Rosemead	11/17/89	2/0	Jackson	orange tree	J. Bercik
	Monterey Park	11/20/89	1/0	Jackson	calamondin	D. Quimayousie

Mediterranean Fruit Fly, *Ceratitis capitata*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
	Southgate	11/20/89	0/1	McPhail	orange	E. Ferre
	Eagle Rock/L.A.	11/20/89	1/0	Jackson	orange tree	T. Brown/S. Bennett
	Whittier*	11/20/89	3/0	Steiner	orange tree	E. Sanchez et al.
		11/20/89	2/0	Steiner	avocado tree	P. Ermatinger et al.
		11/21/89	5/0	Steiner	orange tree	A. Avila et al.
		11/21/89	4/0	Steiner	lemon tree	E. Sanchez et al.
		11/21/89	1/0	Steiner	grapefruit tree	P. Ermatinger et al.
		11/21/89	1/0	Steiner	strawberry guava	E. Sanchez et al.
		11/22/89	2/0	Steiner	orange tree	P. Ermatinger et al.
		11/22/89	1/0	Steiner	macadamia tree	E. Sanchez et al.
	Pasadena	11/21/89	1/0	Jackson	persimmon	D. Hodges/B. Tyson
	Monrovia/ Temple City	11/20/89	0/1	McPhail	orange tree	F. Munchmeyer
		11/29/89	0/1	McPhail	orange tree	E. Kheir
	* Whittier finds are within the West/Covina Baldwin Park and Whittier sterile Medfly release area.					
Los Angeles	Downey/Norwalk	11/27/89	0/1	McPhail	lemon tree	K. Schober et al.
		11/28/89	0/1	McPhail	lemon tree	K. Carrillo et al.
	Whittier	11/28/89	2/0	Steiner	orange tree	P. Ermatinger et al.
		11/28/89	1/0	Steiner	lemon tree	S. Robertson et al.
		11/29/89	2/0	Steiner	peach/orange	E. Sanchez et al.
	Monterey Hills*	11/28/89	0/1	McPhail	lemon tree	S. Bennett
	* The find is within the South Pasadena aerial malathion bait spray area.					
Los Angeles	Valinda	11/29/89	1/0	Steiner	orange tree	M. Wu
	Temple City	11/30/89	0/1	McPhail	?	E. Kheir
		12/1/89	0/1	McPhail	?	E. Kheir
	Bell*	12/4/89	1/0	McPhail	orange tree	A. Lomeli
	* The find is just outside the South Gate aerial malathion bait spray area.					

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Los Angeles	La Habra	12/5/89	0/2	McPhail	orange tree	J. Lopez
	Lakewood	12/5/89	0/1	McPhail	lemon tree	J. Lopez
		12/5/89	0/1	McPhail	orange tree	K. Schober
	San Gabriel	12/5/89	3/1	McPhail	?	J. Vivas
	Alhambra	12/7/89	1/0	Jackson	grapefruit	J. Estevez
	Boyle Heights*	12/7/89	0/1	McPhail	lemon tree	D. Davis/S. Moulton
		12/7/89	0/1	McPhail	tangerine tree	D. Davis/S. Moulton
* The first find is inside the Eagle Rock aerial malathion bait spray area and the second find is outside the South Pasadena aerial malathion bait spray area.						
Los Angeles	Arcadia	12/8/89	1/0	McPhail	lemon tree	E. Kheir
	Lynwood	12/8/89	0/1	McPhail	orange tree	K. Chow
	Valinda	12/9/89	0/1	Steiner	orange tree	P. Ernatinger et al.
	Whittier	12/9/89	3/0	Steiner	orange tree	A. Oshum et al.
	Baldwin Park	12/9/89	1/0	Steiner	?	B. Tyson
	Glendora	12/11/89	0/2	McPhail	orange/fig	P. Garcia
	Panorama City	12/12/89	0/1	McPhail	orange tree	G. Sanchez
	Willowbrook*	12/14/89	0/1	McPhail	lemon tree	K. Mizubayashi
* The find is outside the South Gate malathion bait spray area.						
Los Angeles	Whittier*	12/14/89	Larva	3-3rd instar	calamondin	R. Duran/A. Davis
* The Whittier larval find is within the West Covina/Baldwin Park and Whittier sterile Medfly release areas.						
Los Angeles	East Los Angeles	12/20/89	1/0	Jackson	orange tree	G. Shumaker
* Aerial malathion treatment applied on 1/4/90.						
Los Angeles	Monrovia	12/26/89	0/1	McPhail	orange tree	C. Cabacungan
* Aerial malathion treatment applied 1/11/90.						



MEDFLY STATUS OVERVIEW

Since July 1989, the U.S. Department of Agriculture (USDA), California Department of Food and Agriculture (CDFA), and county departments of agriculture have been involved in Mediterranean fruit fly (Medfly) eradication projects in Los Angeles, Santa Clara, San Bernardino, and Orange Counties.

The first fly was trapped on July 20, 1989, near Dodger Stadium in Los Angeles County. Intensified trapping caught several more flies over the next few days. Ultimately, 40 flies were trapped. On the advice of the Science Advisory Panel (SAP), an eradication program began, consisting of a single aerial application of malathion bait, followed by release of sterile flies for two Medfly generations. This program was completed in September.

In August and September, Medflies were trapped in Mountain View, Santa Clara County, in the Baldwin Park, Valinda, and Whittier areas of Los Angeles County, and in the Upland area of San Bernardino County. In all of these cases, eradication treatments used earlier on the Elysian Park Medfly infestation were initiated. However, beginning on October 25, when a Medfly was trapped in the Sylmar area of Los Angeles County, numerous flies were trapped in widely-scattered locations throughout the Los Angeles and Orange County areas. To date, there are ten separate treatment locations, covering 298 square miles, being aerially treated with malathion bait spray (Sylmar, North Hollywood, Panorama City, Irwindale, Rosemead/Monrovia, Brea/La Habra, South Gate, Glendora, Eagle Rock/South Pasadena, and Downey/Norwalk).

The SAP has recommended that the areas be treated every three weeks until spring. A bait spray program will be required for the ten treatment areas and all new areas. Release of sterile Medflies will continue in the Baldwin Park/Valinda/Whittier areas of Los Angeles County, Mountain View, Santa Clara County, and Upland, San Bernardino County.

SUMMARY - 1989 MEDITERRANEAN FRUIT FLY FINDS

County	Adults Trapped	Date Last Adult Trapped	Larval Properties
Los Angeles	232	12/26/89	24
Orange	2	12/07/89	0
San Bernardino	1	9/25/89	0
Santa Clara	25	11/06/89	2
	260		26

ORIENTAL FRUIT FLY, *Dacus dorsalis*, -(A)- In addition to the many Medfly finds, numerous Oriental Fruit Fly (OFF) have been trapped in widely-scattered locations in Southern California. The following charts outline the various finds since September 1989.

Oriental Fruit Fly, *Dacus dorsalis*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Alameda	Fremont	9/11/89	1/0	Pherocon	apple tree	L. Worden
Los Angeles	Burbank*	9/1/89	2/0	Jackson	peach tree	W. Dias
		* CDFA initiated male OFF annihilation treatments 9/1/89 in an eight-square-mile area around the Burbank finds.				
Los Angeles	Cerritos	9/1/89	3/0	Jackson	orange tree	P. Rosborough
		9/4/89	1/0	Jackson	orange tree	A. Vingua
	Carson*	9/7/89	1/0	Jackson	plum tree	A. Lomeli/C. Wait
		9/8/89	0/1	McPhail	?	A. Lomeli/C. Wait
		* CDFA initiated male OFF annihilation treatments 9/8/89 in a 14-square-mile area around the Carson finds.				
Los Angeles	Westchester*	9/8/89	1/0	Jackson	peach tree	L. Syed
		9/12/89	1?/0	Jackson	orange tree	B. Ruse
		* CDFA initiated male OFF annihilation treatments 9/12/89 in a one-square-mile area around the Westchester finds.				
Los Angeles	Cerritos*	9/12/89	1/0	Jackson	orange tree	P. Rosborough
		10/3/89	1/0	Jackson	orange tree	J. Bercik/E. Ferre
		* All of the male OFF were sexually mature.				
Los Angeles	Silver Lake	10/5/89	1/1	Jackson	avocado tree	P. Busatto
		10/6/89	2/0	Jackson	fig tree	P. Busatto
		10/8/89*	1/0	Jackson	tangerine tree	P. Busatto
		10/7/89	1/0	Jackson	lemon tree	S. Moulton et al.
		10/9/89	0/1	McPhail	persimmon tree	J. Hartman et al.
		* CDFA initiated male OFF annihilation treatments in a nine-square-mile area around the finds on October 7.				
	Arcadia/ Monrovia	10/9/89	1/0	Jackson	grapefruit tree	C. Cabacungan
		10/9/89	0/1	McPhail	?	C. Cabacungan

Oriental Fruit Fly, *Dacus dorsalis*, (A)

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Los Angeles	Arcadia/ Monrovia	10/10/89	2/0	Jackson	guava tree	S. Moulton
	Cerritos	10/18/89	2/0	Jackson	orange tree	F. Munchmeyer
		10/25/89	1/0	Jackson	orange tree	T. Dimock
	Lennox*	10/24/89	1/0	Jackson	lemon tree	L. Syed
* E. Fisher determined that the male OFF was sexually mature.						
Los Angeles	Arcadia	12/8/89	1/0	McPhail	orange tree	C. Cabacungan et al.
		12/10/89	1/0	Jackson	kumquat tree	S. Austin et al.
Orange	Mission Viejo	9/29/89	1/0	Jackson	apple tree	M. Edgecomb
Santa Barbara	Santa Barbara	9/28/89	1/0	Jackson	orange tree	J. Bens
Ventura	Ventura	10/27/89	1?/0	Jackson	loquat tree	T. Dimock

SUMMARY - 1989 ORIENTAL FRUIT FLY FINDS

COUNTY	ADULTS TRAPPED	DATE LAST ADULT TRAPPED	LARVAL PROPERTIES
Alameda	1	9/11/89	0
Los Angeles	58	12/10/89	0
Orange	3	9/29/89	0
Sacramento	1	5/11/89	0
Santa Barbara	1	9/28/89	0
Ventura	1	10/27/89	0
	65		0

MEXICAN FRUIT FLY, *Anastrepha ludens*, -(A)- This third member of the Tephritid trio is also being trapped in the greater Los Angeles Basin.

Los Angeles County

- Los Angeles County Department of Agriculture trapper Arturo Lomeli found one male and two female Mexican fruit flies (MxFF) September 11, 1989, in a McPhail trap in Lynwood. The trap was placed in a fig tree on San Vincente Avenue. CDFA Insect Biosystematist Eric Fisher determined that all of the MxFF were sexually immature. One female fly contained partially developed eggs but was not mated.
- Two MxFF were trapped on December 5, 1989, at sites on Oregon Avenue in Boyle Heights and Tweedy Boulevard in South Gate. The finds are approximately five miles apart and were detected in McPhail traps. The fly found in Boyle Heights was a sexually immature male and the South Gate find was an unmated female. CDFA Inspector Richard Epps and Los Angeles County Department of Agriculture trapper Steve Bennett are credited with finding the MxFF.
- A sexually mature male MxFF was trapped December 20, 1989, in East Los Angeles. Los Angeles County Department of Agriculture trapper Arturo Lomeli found the fly in a McPhail trap that had been placed in an orange tree on Princeton Street.

San Diego County

- CDFA Agricultural Aide Alex Porras found a male MxFF on September 11, 1989, in a McPhail trap in San Diego. The trap was placed in a lemon tree on 41st Street. McPhail trap density in the area is 25 traps per square mile. A high trap density is maintained throughout the year in this area of San Diego County because of the potential threat of the MxFF being introduced into California.
- An unmated female MxFF was found in a McPhail trap placed in a lemon tree on "J" Street in Chula Vista. San Diego County Department of Agriculture trapper Dick Rodgers serviced the trap in which the fly was detected.
- CDFA Inspector Elizabeth Dreismeyer found a mated female MxFF in a McPhail trap placed in an orange tree on Boston Avenue in Logan Heights. The find is approximately three-fourths of a mile from a MxFF trapped April 14 on Clay Avenue.
- On November 9, 1989, San Diego County Department of Agriculture trapper Charlette Castellanos found a sexually mature male MxFF in a McPhail trap located in Chula Vista. The trap was placed in a lemon tree on Marble Court.
- An unmated female MxFF was found in a McPhail trap placed in a lemon tree on J Street in Chula Vista. San Diego County Department of Agriculture trapper Dick Rodgers serviced the trap in which the fly was detected.
- CDFA Inspector Elizabeth Dreismeyer found a mated female MxFF in a McPhail trap placed in an orange tree on Boston Avenue in Logan Heights. The find is approximately three-fourths of a mile from a MxFF trapped April 14 on Clay Avenue.
- On November 9, 1989, San Diego County Department of Agriculture trapper Charlette Castellanos found a sexually mature male MxFF in a McPhail trap located in Chula Vista. The trap was placed in a lemon tree on Marble Court.
- A male MxFF was trapped on November 27 in a McPhail trap placed in sapote tree on South First Avenue in Chula Vista. This find is approximately three-fourths of a mile from a MxFF trapped on November 1 on J Street. San Diego County Department of Agriculture trapper Dick Rogers serviced the trap in which the fly was detected. CDFA Insect Biosystematist Eric Fisher determined that the fly was sexually mature.

- A male MxFF was found December 1, 1989, in a McPhail trap placed in a sapote tree on Sunrise Drive in San Ysidro. On December 4, an unmated female was trapped about three miles northwest at a site on Hollister Street in San Diego. The fly was found in a McPhail trap placed in a lemon tree. San Diego County Department of Agriculture trappers Charlette Castellanos and James Baldas-Rodriguez inspected the traps in which the flies were found.
- On December 6, 1989, San Diego County Department of Agriculture trapper James Baldas-Rodriguez found a sexually immature female MxFF in a McPhail trap placed in an orange tree on Vista Lane in San Ysidro.

Santa Clara County

- A female MxFF was trapped September 20, 1989, in San Jose, Santa Clara County. The fly was found in a McPhail trap placed in an orange tree on Bay Haven Drive. Santa Clara County Department of Agriculture trapper Jerry Rojas is credited with making the find. CDFA Insect Biosystematist Eric Fisher determined that the female MxFF contained well-developed eggs but was unmated.

SUMMARY - 1989 MEXICAN FRUIT FLY FINDS

COUNTY	ADULTS TRAPPED	DATE LAST ADULT TRAPPED	LARVAL PROPERTIES
Los Angeles	5	12/05/89	0
Orange	2	4/20/89	0
San Diego	9	12/06/89	0
Santa Clara	1	9/20/89	0
	17		0

GYPSY MOTH, *Lymantria dispar*, -(A)- Large numbers of gypsy moths have also been trapped this year [see CPPDR 8(3-4):48-55]. The following report and chart bring the 1989 finds up to date:

Marin County

- While conducting a visual survey in the vicinity of gypsy moth (GM) trap finds in Tiburon on August 30 and 31, 1989, CDFA personnel found viable GM egg masses at a condominium complex on Lagoon Vista. Fourteen gypsy moths have been trapped

at this location in 1989. In addition to the egg masses, cast gypsy moth larval/pupal skins and a dead gravid female moth were found.

- CDFA Area Manager Aurelio Posadas, Detection Entomologist Neil Wright, and Insect Biosystematist Tom Eichlin and Terry Seeno are credited with making the finds. Napa County Department of Agriculture Standards and Service Worker Bruce Rodriguez had briefly joined the crew for training and found one of the egg masses.

Shasta County

- Two gypsy moths were trapped June 29 and July 1, 1989, in Cottonwood, Shasta County. On June 29, one moth was found in a GM trap placed in an oak tree along Greengate Road. The other moth was trapped July 1, approximately one-half mile south, at a site along Fullerton Way. It was found in a GM trap placed on a telephone pole. Shasta County Department of Agriculture trappers Janet Gross and Susan McQuown are credited with finding the gypsy moths.

SUMMARY - 1989 GYPSY MOTH FINDS

COUNTY	ADULTS TRAPPED	DATE LAST ADULT TRAPPED	PROPERTIES EGG MASSES/ PUPAL CASES
Alameda	2	7/15/89	0
Los Angeles	4	8/4/89	0
Marin	25	8/31/89	1
Nevada	3	7/10/89	0
Orange	2	7/19/89	0
Placer	3	7/10/89	1
Sacramento	1	7/13/89	0
San Diego	8	7/20/89	0
San Joaquin	1	8/8/89	0
San Mateo	1	7/17/89	0
Santa Clara	1	7/3/89	0
Shasta	2	7/1/89	0
Tuolumne	1	7/19/89	0
Ventura	2	7/12/89	0
	56		2

VARROA MITE, *Varroa jacobsoni*, -(A)- The first non-quarantine California finds of this honey bee parasite were made in Riverside County in January 1989 [CPPDR 8(1-2):5-8]. Further finds have been made this summer. See the following reports:

Alameda County

- Numerous Varroa mites (VM) were detected in a bee colony on November 27, 1989, in the Mountain House area of Alameda County. Bert Curtner of the Alameda County Department of Agriculture is credited with finding VM in this apiary. The beekeeper has indicated that he has not purchased queens outside of California or moved his colonies interstate. Follow-up information may clarify how this apiary of 135 colonies became infested. The infested apiary has been placed under hold order pending abatement of the pest as provided for in the Apiary Protection Act. The beekeeper will be billed for the 30-day treatment with Apistan strip. A survey of the one-mile radius from the infested apiary indicated there were no exposed apiaries.
- Bert Curtner and J. Newey discovered six female VM on December 7 in Alameda County at the Castello Home Ranch. There are 86 colonies in the apiary.

Sacramento County

- Two VM were detected in a bee colony on November 29, 1989, near Sacramento. Tom Raschke of the Sacramento County Department of Agriculture is credited with finding *Varroa jacobsoni* in this apiary. The beekeeper has indicated that he has not moved his colonies interstate, but has bought queens from Georgia. The infested apiary of 76 colonies has been placed under hold order pending abatement of the pest as provided for in the Apiary Protection Act. The beekeeper will be billed for the 30-day treatment with Apistan strip. A survey of the one-mile radius from the infested apiary resulted in the testing of a small apiary consisting of fourteen colonies.

Riverside County

- A VM was found in an apiary in Riverside County on December 6, 1989. The apiary consisted of 232 colonies.

San Bernardino County

- Two female VM were detected in an apiary in Bryn Mawr, San Bernardino County, on December 20, 1989. There are 97 colonies

in the apiary. The VM were discovered during a VM "resident" survey.

Madera County

- On December 22, 1989, a female VM was detected in an apiary in Madera County, consisting of approximately 528 hives.

San Joaquin County

- Kirby Brown, Entomologist with the San Joaquin County Department of Agriculture, detected a female VM on December 21, in an apiary in Tracy during a detection survey.

BOLL WEEVIL, *Anthonomus grandis*, -(A)- During the 1985 season, 14,714 weevils were trapped in the desert valleys of southeastern California and an eradication program was started. In 1988, 577 weevils were trapped. This year only two weevils were trapped; one each at Bard, Imperial County and Blythe, Riverside County. The trapping record certainly indicates that the multistate eradication program is heading for success.

NEW STATE RECORDS

HACKBERRY NIPPLEGALL MAKER, *Pachypsylla celtidismammae*, -(Q)- In the January-May issue of the CPPDR [8(1-2):9], the hackberry nipplegall maker was reportedly collected in Modesto, California, on May 4, 1989. On October 13, 1989, confirmation was received on the Stanislaus County finding based on adults and mature galls, which were recollected by the original collector S. Bradford.

NEW COUNTY RECORDS

WEST INDIAN FRUIT FLY, *Anastrepha obliqua*, -(A)- A second specimen of this exotic fruit fly has been captured in California this year. A male West Indian fruit fly was first trapped on June 5 in the City Terrace area of Los Angeles (see CPPDR [8:3-4(46-47)]).

A sexually immature female West Indian fruit fly was trapped for the first time in Chula Vista, San Diego County on November 9. CDFA Inspector Karen Lewis found the fly in a McPhail trap that had been placed in an orange tree on Calle Santiago.

The McPhail trap density in the area was 15 traps per square mile. A high McPhail trap density is maintained in this area of San Diego County because of the potential threat of the Mexican fruit fly being introduced into California from Mexico. In response, CDFA has increased the McPhail trap density in the core square mile to 80 traps per square mile and 40 in the adjacent square miles.

GUAVA FRUIT FLY, *Dacus correctus*, -(A)- This find is the first this year in California.

- A male guava fruit fly was trapped on September 5, 1989, in Los Angeles. The fly was found in a Jackson/methyl eugenol trap placed in a fig tree on Lucas Avenue. Los Angeles County trapper Kirk Mizubayashi is credited with the detection.
- On September 15, 1989, a male guava fruit fly was trapped in the Sun Valley area of Los Angeles. The fly was found in a Jackson/methyl eugenol trap placed in a plum tree on Denny Avenue. Los Angeles County trapper Xavier Camberos is credited with the detection.

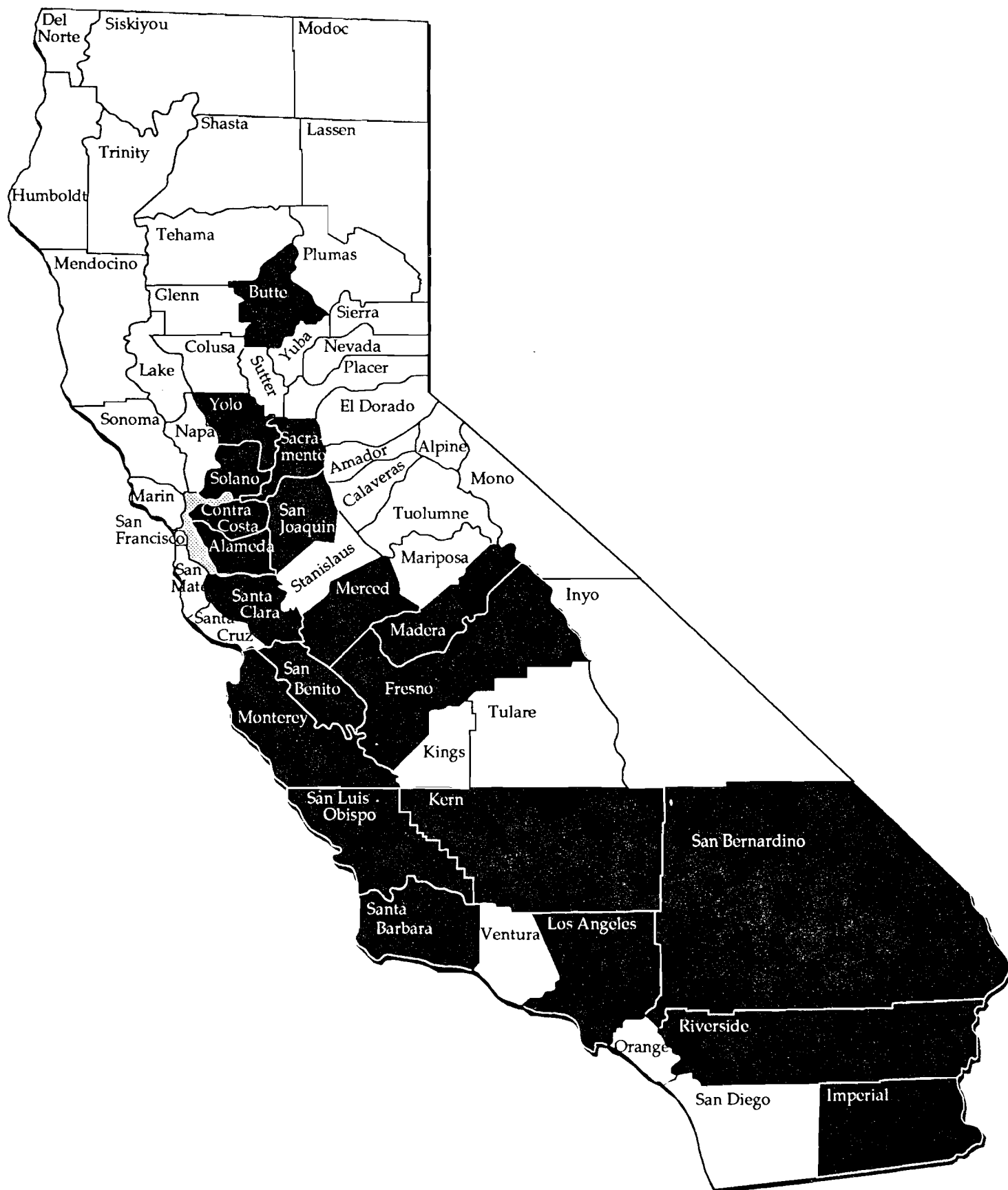
RUSSIAN WHEAT APHID, *Diuraphis noxia*, -(Q)- According to the U.C. Extension Service, Russian Wheat Aphid (RWA) has caused considerable damage throughout the Antelope Valley area of Los Angeles and Kern County. In the United States, total losses are estimated at \$100 million per year. Although the aphid did not cause any damage or require any eradication procedures in Northern California, the pest continues to widen its boundaries into several other counties.

- RWA has been found for the first time in Alameda County on August 29, 1989, in a barley plant at the Gill Tract Experiment Station, University of California, Berkeley. University of California Staff Research Associate Junji Hamai is credited with finding and initially identifying the aphid.
- Butte County reported on August 8, 1989, finding RWA for the first time, in Chico.
- And during the month of November, RWA was also found for the first time in several other counties: Madera, Merced, Santa Barbara, and San Luis Obispo. The samples were all collected by suction traps placed and run by Charles G. Summers, Professor of Entomology at University of California, Davis.

RWA has been found in a total of 18 other counties. It was first detected last year in California near Calexico, Imperial County. Since then, it has been found in the counties of Yolo, San Bernardino, San Benito, Santa Clara, San Joaquin, Riverside, Kern, Los Angeles, Fresno, Sacramento, Solano, Contra Costa, Merced, Madera, San Luis Obispo, Santa Barbara, and Alameda. See distribution map on next page.

Funds were requested from the federal government for agencies involved in the National Russian Wheat Aphid Integrated Pest Management Program. Currently, \$100,000 is earmarked for California out of the little over \$4 million being debated by the Appropriations Committee of Congress. At this time, several countries are being considered for parasite exploration to combat RWA. Thirty other parasite species are being reared in Texas for evaluation. One good candidate is a small wasp, *Diaeretiella rapae*, while another is the seven spotted lady bird beetle (C7), *Coccinella septempunctata*.

California Distribution of Russian Wheat Aphid (as of 12 January, 1990)



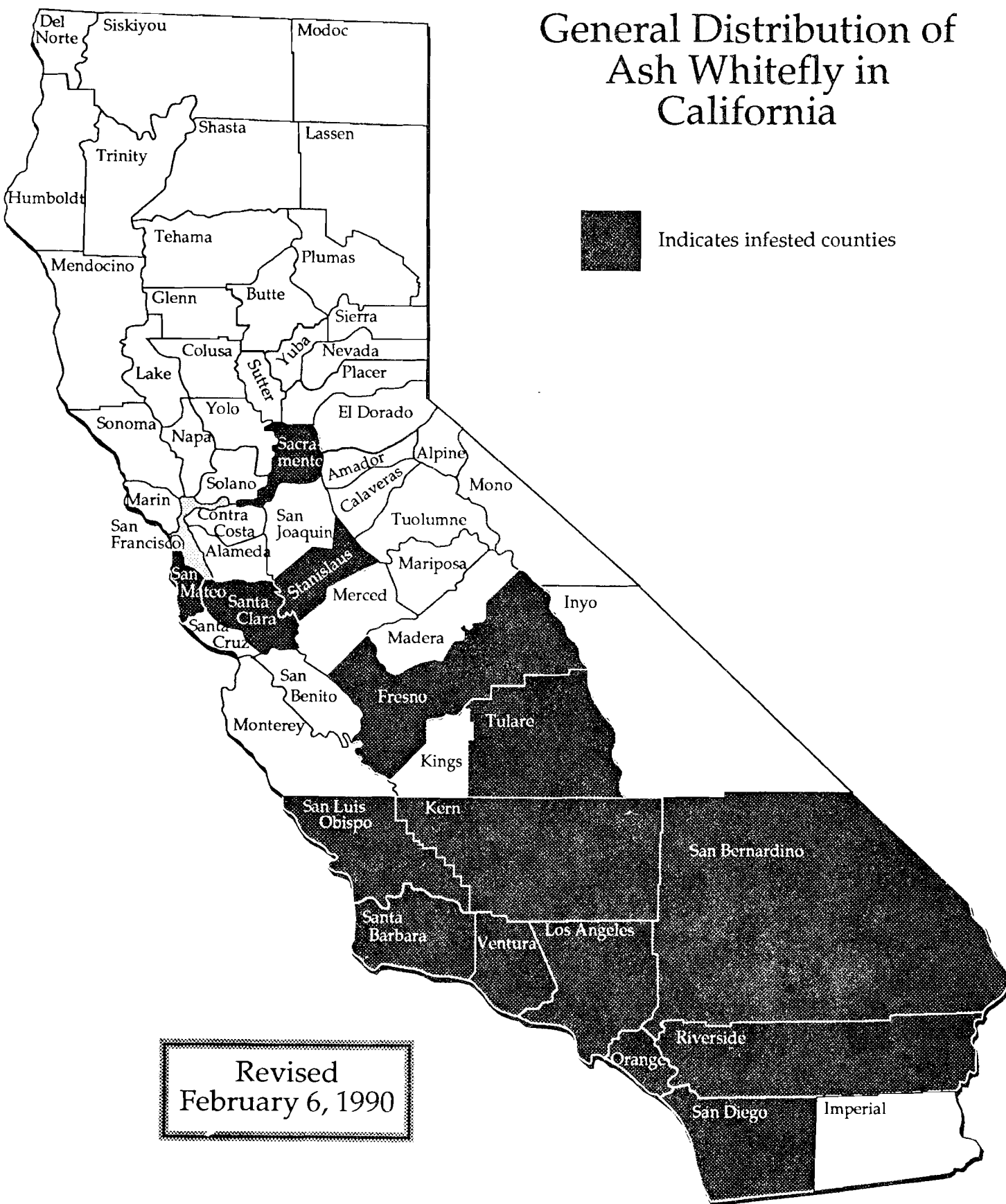
A pamphlet entitled "Russian Wheat Aphid: How to Recognize This New Pest and Its Damage" is now available through the USDA-UC Cooperative Extension IPM Project. The pamphlet has several excellent photographs and indicates useful identification characteristics.

ASH WHITEFLY, *Siphoninus phillyreae*, -(C)- This exotic whitefly pest was first found in Los Angeles, California, in 1988, CPPDR [7(1-4):8-13], and shortly thereafter was found in Orange and San Bernardino Counties, CPPDR [7(5-6):80]. Since then, the pest has been discovered in six new counties and on many new hosts during the last quarter of 1989.

- Ash whitefly was found September 1, 1989, for the first time in Kern County. The whitefly was found in a pomegranate tree at a residence on Century Drive in Bakersfield. Kern County Department of Agriculture Biologist David Daoud was responding to a homeowner's request for assistance following the publication of an article on ash whitefly in a local newspaper. According to David, ash whitefly is now widespread in Bakersfield and the preferred host is pomegranate.
- Fresno County reported finding ash whitefly in a northeast Fresno residential neighborhood on September 26 as a new county record. The fly was captured by Carol Hafner, Fresno County Agricultural Deputy Commissioner, who found the pest in a bradford pear tree. It was later found by Fresno County entomologist Norm Smith at a highway rest stop along Interstate 5, north of Coalinga.
- Sacramento County of Agriculture Deputy Commissioner James Cox detected ash whitefly in Sacramento on October 5 on an evergreen ash. This is a new county find. By early fall, it had been found in a 100-square-block area in the downtown sections of the city.
- Tulare County reported a new county record for ash whitefly on October 20. Adults, eggs and nymphs were found in Visalia on a flowering pear tree by County collectors R.D. Haines and M. DeJhon. Further collecting resulted in finds in west Visalia, Tulare and Goshen.
- Another ash whitefly was found on October 21 for a new county record in Stanislaus County. The whitefly was found by Baldo Villegas, CDFA Pest Management Specialist, in a Modesto ash tree. The find was made at a Highway 99 safety rest stop.
- On November 29, 1989, ash whitefly was found in Santa Clara County for the first time. County collector Stan Maggi receives credit for the find, which he made on The Woods Drive in San Jose.

Since its initial detection last year in Los Angeles County, ash whitefly now occurs in Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Kern, Santa Clara, Tulare, Fresno, Stanislaus, Sacramento, and Ventura Counties.

General Distribution of Ash Whitefly in California



A recently published article by Tom Bellows and others in *California Agriculture* [44(1:4-6)], contains excellent photographs of the whitefly and its damage. The article primarily covers the introduction of natural enemies which was initiated this summer. A complete host list is also included. Yet another comprehensive article on ash whitefly, by John Sorensen and others, is due to be published in the January 1990 issue of *Pan Pacific Entomologist*.

A WHITEFLY, *Paralyrodes* sp.-(Q)- This undescribed whitefly was first found in California by Belinda Moss at San Diego in 1985 [see CPPDR issues 4(4):111, 1985 and 5(6):289, 1986] . The whitefly has now extended its range into Orange County. It was collected on April 25 at Santa Ana by Nick Nisson and M. Tafreshnia.

The species is apparently undescribed although American whitefly taxonomists have been reluctant to describe the species because of taxonomic problems within the genus. There are a number of species known from tropical America, but descriptions of these are inadequate for identification of several of the species, and the type specimens are not available. However, the species has apparently been introduced into Syria, and Steve Nakahara, whitefly taxonomist at the Systematic Entomology Laboratory in Beltsville, Maryland, tells us that a scientist in Syria is planning on describing it. In the meantime, San Diego County officials indicate that it is becoming a nuisance, and they are concerned about possible problems with it in commercial avocado orchards.

Pest Exclusion

Produce Police on the Prowl - The Mediterranean fruit fly eradication campaign in the greater Los Angeles area has some other facets besides trapping and spraying. Pest Exclusion personnel from CDFA, the USDA and the counties are deeply involved in the quarantine aspects of the program. One important facet of the work generally involves maintaining contact with retailers engaged in the sales of produce within the quarantine boundaries. This type of sales activity is considered a special risk most likely to result in spreading the infestation. One major regulation for the larger retail establishments is the requirement of covering all host material on the produce shelves. But also, in the quarantine area, there is a special vigilance maintained for itinerant street vendors. Most of these vendors sell seasonal fruit and vegetables. Many of them do so from step vans which they drive and park in neighborhoods quite remote from supermarket shopping.

Since many of these street vendors are recent immigrants to the United States, they understandably are at the entry level in the economy. They generally lack familiarity with the English language as well as with the laws and customs of this country. So considerable effort is spent with them to enable them if at all possible to continue their employment, but in a manner which lowers the risk of the Medfly infestation being spread by them.

Most of the vendors have been cooperative in covering and thus protecting their fruit displays. Occasionally, however, it has been necessary to seize fruit host material when the particular vendor, despite repeated contact with enforcement officials, has continued to sell host

material that has been exposed in the infested zones. So far, no serious altercations have occurred, although some seizures can result in bad feelings on the part of the vendors. To date, the worst such incident involved a substantial seizure from a Glendale street vendor who had formerly been a high school teacher in Soviet Armenia. Despite his meager command of English, he was vehement in giving reasons why his unprotected fruit should not be seized. He had previously received warning and clear directives, which he had apparently understood, but failed to observe. His final remark as the bagged host material was taken away was that now he would not be able to buy the cow he wanted. This must work with the commissars, but made no impression in Glendale. The next day he was observed to be in full compliance.

Several of the CDFA personnel involved in this type of Medfly quarantine work are Eugene Fife from Campbell, John Baker from Fresno and Stephen Brown from Sacramento.

SIGNIFICANT FINDS IN OTHER STATES

ASH WHITEFLY, *Siphoninus phillyreae*, -(C)- Ash whitefly was found in Phoenix, Arizona, for the first time on December 5, 1989. It has since been found on nursery stock moving from Phoenix into California. The shipments were intercepted by Los Angeles County inspectors.

WESTERN WHEAT APHID, *Diuraphis tritici*, -(Q)- Infestations of the western wheat aphid were found for the first time in Kansas on November 16, 1989. Light populations were found on both volunteer wheat and western wheatgrass in Stanton County by K.O. Bell, Jr., Survey Entomologist, Kansas State Board of Agriculture, while conducting field surveys for wheat pests. Samples of aphids from both hosts were sent to Dr. Manya Stoetzel, USDA, ARS, Insect Identification Laboratory, Beltsville Agricultural Research Center in Beltsville, Maryland, who identified them as the western wheat aphid on November 22, 1989.

According to Dr. Stoetzel, the finding of the species in Kansas represents a NEW STATE RECORD for Kansas. Dr. Stoetzel said that the western wheat aphid has occasionally been reported to cause significant damage to wheat and is also reportedly found on barley and various wheatgrasses, *Agropyron spp.* Dr. Stoetzel said she found previous records of this aphid from the following states: Oklahoma, Texas, New Mexico, Colorado, Wyoming, South Dakota, Montana, Utah, Washington and Illinois. It has also been reported from western Canada. For more information, contact K. O. Bell at (913) 539-7945

The interesting aspect of this aphid is the close morphological similarity with the Russian wheat aphid. The primary difference between the two species is that the western wheat aphid lacks the supracaudal tubercle appendage.

AFRICANIZED HONEY BEE, *Apis mellifera scutellata*, -(A)- A swarm of Africanized Honey Bees (AHB) was removed from a shrimp boat at Brownsville, Texas. Its origin was either Yucatan or Progreso, Mexico. Another swarm was trapped 150 miles south of Brownsville.

Another death associated with AHB has occurred. A 61-year-old man in Tapachula, Chiapas, Mexico, was stung by a swarm of bees near his home. He was hospitalized and died a week later.

CEREAL LEAF BEETLE, *Oulema melanopus*, -(A)- The cereal leaf beetle was found in Montana on June 12, 1989. The specimen was confirmed by Dr. Jay Kerrin in Utah on June 19. Adults and larvae were found on several fields of winter wheat and barley in Yellowstone county. Since the first observation, there have been unconfirmed reports of cereal leaf beetle in Carbon and Stillwater counties as well. This is a new state record for Montana. Confirmed observations are being entered into NAPIS.

WALNUT HUSK FLY, *Rhagoletis completa*, -(C)-An adult walnut husk fly was found in an apple maggot trap in an apple orchard in Bisbee, Arizona, on October 25, 1989. Bisbee is in Cochise County. The fly will be subject to eradication if future trapping reveals that the insect is confined to a small enough location.

JAPANESE BEETLE, *Popillia japonica*, -(A)- An account was given in the last issue of CPPDR, [8(3-4):59], about the Japanese beetle infestation at Cave Junction in southern Oregon. By way of an update, there were a total of 87 adult beetles trapped this summer by the Oregon Department of Agriculture. A quarantine was placed on the infested area and the trapping program was enhanced to include 477 traps in the town in order to determine the epicenter and spread. Two sprayings of the insecticide Sevin were made initially, and in late August, the grass and turf areas were sprayed with Turcam to eradicate any larvae in the soil. Eradicative measures are planned for the next two or three years.

SIGNIFICANT FINDS IN OTHER COUNTRIES

MEDITERRANEAN FRUIT FLY, *Ceratitidis capitata*, -(A)- USDA/APHIS was informed on January 16 by Chilean officials of the detection of Medfly in dooryard peaches in Los Andes on January 15 and the subsequent trapping of three adults in the same area. Chile has outlined quarantine detection, and eradication efforts have begun. USDA/APHIS personnel in Chile area currently onsite reviewing the program's adequacy.

No host crops from the infested area will be allowed movement to the United States or other areas of Chile unless subjected to an approved treatment. Produce from noninfested areas of Chile will continue to be precleared for movement to the United States.

USDA/APHIS personnel's ongoing review will be the basis for any further change in USDA policy towards Chilean fruits and vegetables.

Chile is one of the largest exporters of winter fruits and vegetables to the United States. These fruits and vegetables are inspected and/or treated by USDA/APHIS inspectors in Chile at the expense of Chilean exporters. Chile was considered to be Medfly-free with the exception of the northern border adjacent to Peru where they carry out an active exclusion and eradication program. Previous infestations in production areas of Chile have been eradicated through aggressive action similar to those currently being taken in California. Chilean produce from outside the quarantined areas will continue to be precleared for importation into the United States.

Border Stations

Keeping exotic pests out of California becomes more and more difficult every day. A fast growing human population in the state, along with the tremendous diversity in cultures, interests and appetites, spells trouble in attempts to stem the tide of these exotics. The following two reports by Richard Brown on Border Station personnel serve as an example of the complexity of the quarantine problem, and on the positive influence these stations have on the overall quarantine effort:

Outstanding Interception Noted - The "A" rated alligatorweed, *Alternanthera philoxeroides*, (viable stems and leaves) was found in a COMMERCIAL truckload of live clams from Alabama. The interception was made by Dennis Day at the Blythe station on November 2. The truck destination was Yuba City.

Thailand Citrus Tree - Blythe PQI Brenda Johnson made an interesting and significant interception on November 5. She found a citrus tree which had been brought into the country from THAILAND. The owner, who stated that the leaves were used as seasoning in cooking, was in a California auto. The young tree had been obtained in Texas.

The watchful eye of the California plant quarantine system often turns up infestations of pests in other areas where they were not previously recorded. The following report is just such an example:

Apple Maggot in Bend, Oregon - Dorris PQS Brian Shurtleff submitted live larvae from apples on September 4, 1989, since confirmed as apple maggot (*Rhagoletis pomonella*), that were reported as home grown fruit from the property of a friend in Bend, Oregon. Bend (Deschutes County), located east of the Cascade Range, has not previously been known to be infested with apple maggot. We are attempting to get an independent confirmation of this interception.

And the hungry hordes keep multiplying! The following report outlines a subject of serious concern to the California agricultural industry:

More And More Fire Ants - During the first quarter of the 1989/90 fiscal year (July 1 to September 22) confirmed border station interceptions of red imported fire ant, *Solenopsis invicta*, (and other *Solenopsis* spp.) have reached a total of 157. This compares with a total of 30 for the same period of fiscal year 1988/89. This 423% increase is a major concern to CDFA!

Botany Highlights

NEW COUNTY RECORDS

SKELETON WEED, *Chondrilla juncea*, -(A)- This Mendocino County record for skeletonweed is a significant new location in California. It demonstrates the weed's ability to find its ecological niche in new plant communities in the state. The nearest previously known locations have been as roadside waifs in Yolo and Solano counties (see attached weed distribution map).

This new occurrence was discovered and brought to our attention by Don Joley, a CDFA biologist with Environmental Monitoring and Pest Management at Meadowview. Jim Xerogeanes, Mendocino County biologist, located the infestation from Joley's telephoned description and sent specimens to the Botany Laboratory for confirmation. The infestation consisted of three plants on the edge of Highway 1 right next to the ocean. "Well Done!" all around.

OTHER SIGNIFICANT FINDS

BEARDED CREEPER, *Crupina vulgaris*, -(A)- Bearded creeper was found in early spring at a new location in Sonoma County. The nearest previously known location was 4,000 feet to the southwest in Section 29, just east of Matanzas Creek at the southeast corner of Bennett Valley Golf Course and Dan Galvin Park. *C. vulgaris* was declared eradicated from this site in 1982.

This new occurrence was discovered and brought to our attention by Dr. H. Keith Wagon, a retired CDFA plant pathologist who lives near Annadel State Park in Santa Rosa. In a further survey, an additional six acres of *C. vulgaris* was found in the same general area by Sonoma County Deputy Agricultural Commissioner John Westoby. The resident park ranger, Bill Krumbein, has been apprised of this infestation. See included map.

DUDAIM MELON, *Cucumis melo* var *dudaim*, -(A)-This noxious weed has been found in a new township in Imperial County by Richard Wettle, Imperial County Enomologist. The find was made on November 11 just east of two other known infestations. The new find is at T15S and R14E. See included map.

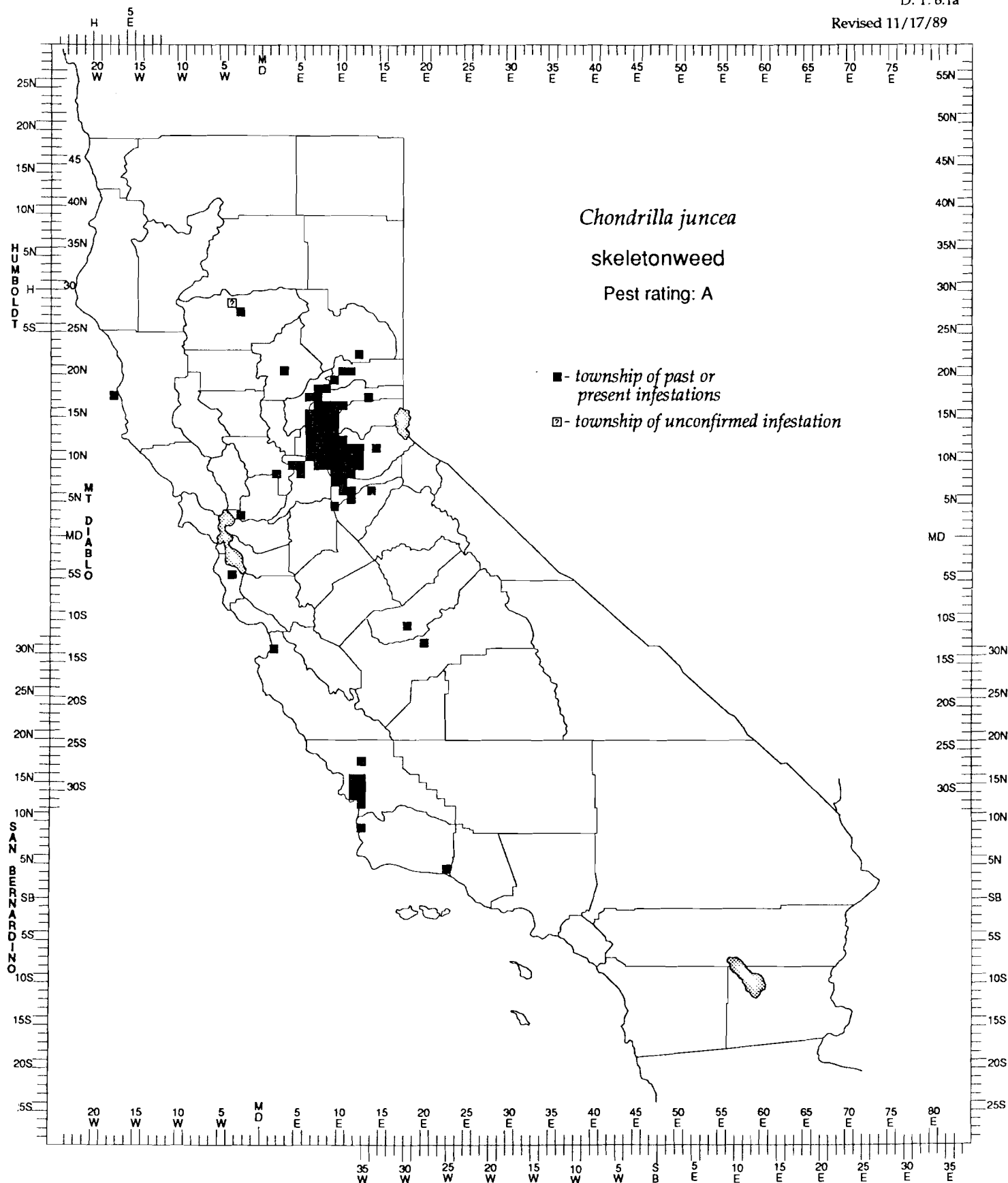
STATE OF CALIFORNIA • DEPARTMENT OF FOOD AND AGRICULTURE

DIVISION OF PLANT INDUSTRY - ANALYSIS & IDENTIFICATION/BOTANY

DETECTION MANUAL

D. T. 6:1a

Revised 11/17/89

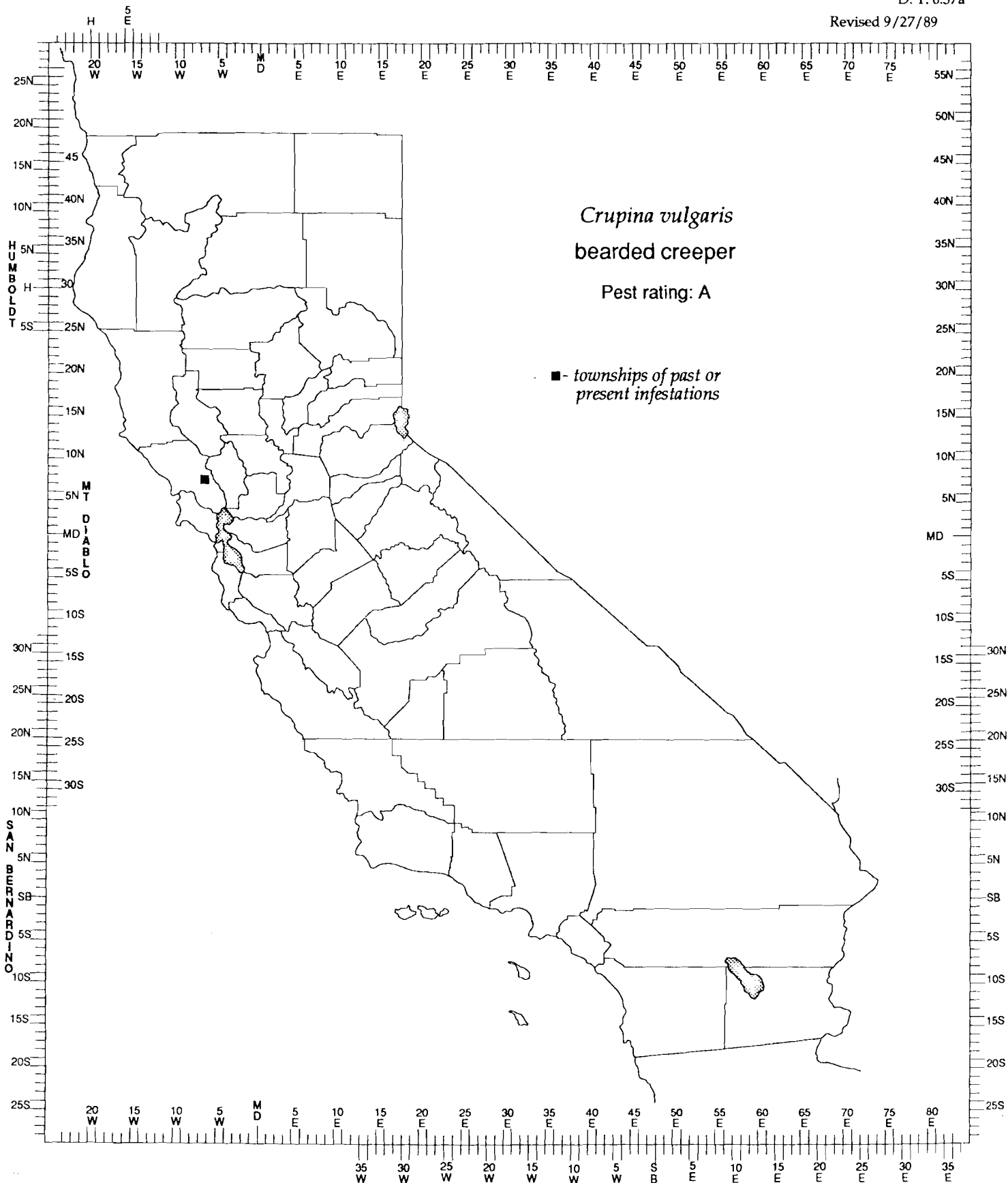


STATE OF CALIFORNIA • DEPARTMENT OF FOOD AND AGRICULTURE

DIVISION OF PLANT INDUSTRY - ANALYSIS & IDENTIFICATION/BOTANY

DETECTION MANUAL
D. T. 6:37a

Revised 9/27/89



Cucumis melo var. *dudaim*
dudaim melon
Pest rating: A

■ - townships of past or present infestations

The map shows the state of California with county boundaries. Shaded areas indicate townships of past or present infestations. These areas are located in the northern part of the state (near the Oregon border), in the central part (near the Nevada border), and in the southern part (near the Arizona border). The map includes latitude and longitude coordinates along the edges.

Plant Pathology Highlights

STRAWBERRY ANTHRACNOSE

by:

Dan Opgenorth, Jeanenne White and Pam Gunnell

Colletotrichum acutatum, one of the causal fungi of strawberry anthracnose, was identified on nursery specimens submitted in October and December of 1989 from Shasta County. This species of *Colletotrichum* has not been previously recorded at CDFA. Laboratory records indicate one other report of strawberry anthracnose; a non-speciated *Colletotrichum* identified from San Diego County in 1985.

The fungus has been previously identified and studied by University of California, Davis, scientists. Darin Eastburn, U.C. Davis, first reported *C. acutatum* in California in 1987. Pam Gunnell, U.C. Davis, has conducted extensive research on three species of *Colletotrichum* isolated from strawberry. She has identified *C. acutatum* from several nursery locations in Monterey, Shasta and Tehama counties, and from home gardens in Sutter and Humboldt counties. Infected strawberry varieties studied included Pajaro, Fern and Heckker, all highly susceptible to the anthracnose fungi.

Historically, anthracnose has not been commonly recognized as an established problem in California production fields because the cool climate is not conducive to development of the disease. However, when nursery grown plants with low-levels of infection are shipped to areas with warm temperatures and high rainfall, the disease may cause severe losses to the strawberry fruit industry. Overhead irrigation in nurseries, high humidity, and temperatures averaging 24-27°C create a favorable environment for growth and dissemination of the fungus. Susceptible strawberry varieties would be especially subject to infection under these conditions.

Losses due to both quarantine restrictions and severe disease epidemics in areas of high infection risk have been reported. Plants harboring the anthracnose fungus, exhibiting only minor symptoms in California, have been shipped to high risk areas such as Florida where severe field losses have occurred. In 1987, one half million plants of the Pajaro variety were shipped to England from a California nursery. The plants were examined by overseas quarantine agencies, the disease was identified and eradication of the shipment was mandated.

Three distinct species of *Colletotrichum* have been identified as causing strawberry anthracnose: *C. fragariae*, *C. gloeosporioides*, and *C. acutatum*. Symptoms typical of *C. acutatum* appear initially on aerial parts of the strawberry plant. Brown, oval, sunken lesions occur on stolons and rarely on leaf petioles causing girdling (Fig. 1). Girdling of the stolons (runners) is followed by wilting and ensuing death of the runner plants. The fungus also infects the root and crown areas causing total collapse and death of the mother plants. The fruit may also be infected causing a rotting and decay of the tissues.



Fig. 1 Anthracnose on strawberry stolons

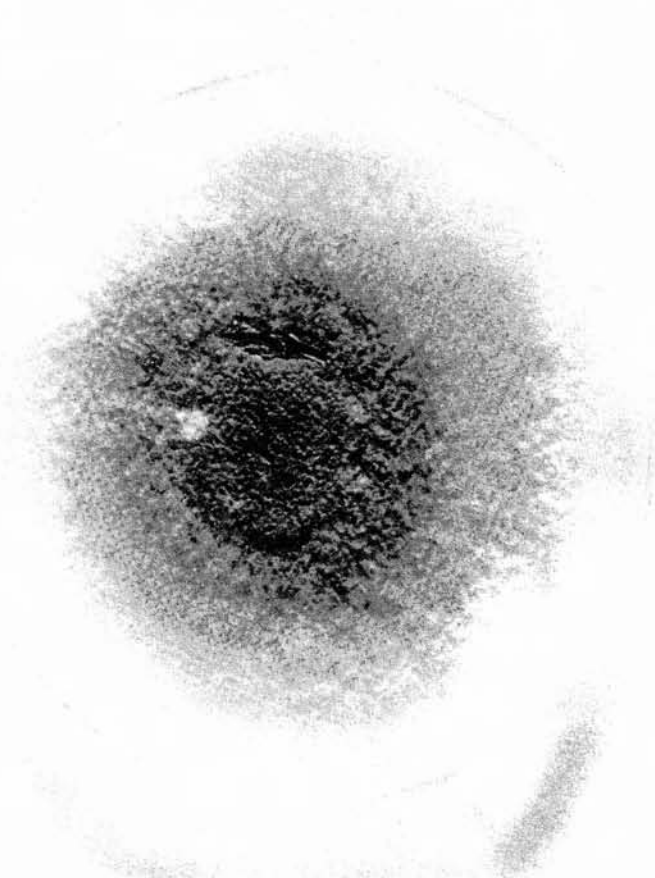


Fig. 2 *Colletotrichum acutatum* in vitro on acid potato dextrose agar.

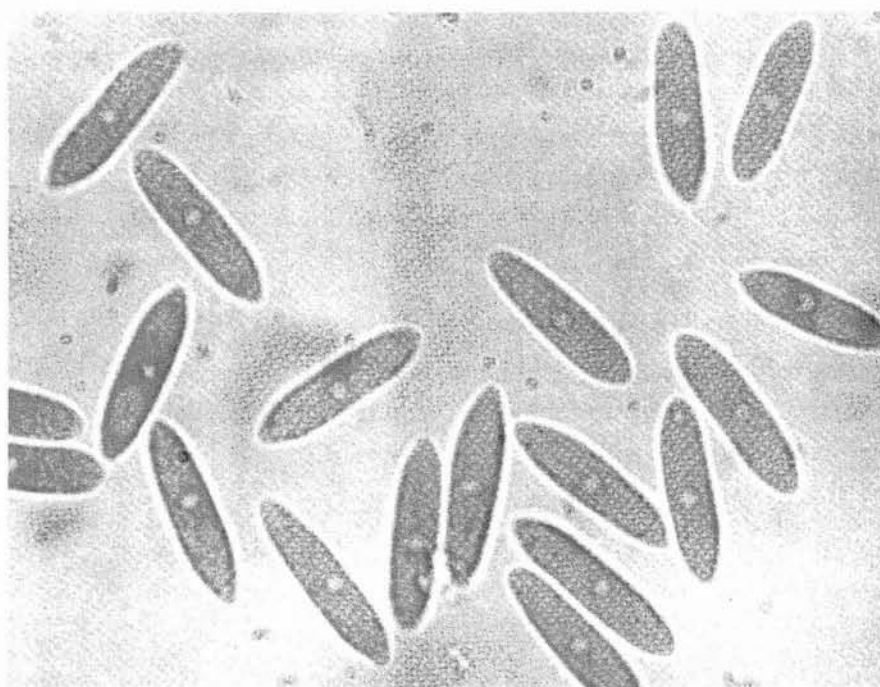


Fig. 3 *Colletotrichum acutatum* conidia tapered to points at both apices.

Fungal spores (conidia) are disseminated rapidly by rain and overhead irrigation. Overwintering of the fungus commonly occurs inside the roots and crown of harvested plants in cold storage. The fungus may survive in leguminous weed hosts, infected field plants and in the soil for over 10 months.

C. acutatum, grown on acid potato dextrose agar (PDA), produces a slow growing (1 cm. dia./3 days) colony of light grey mycelium and salmon colored conidia in mass (Fig. 2). The conidia, produced in fungal fruiting structures called acervuli, are 12-20 x 2.5-4 μ , hyaline and pointed on both ends (apices) (Fig. 3). Production of setae (dark hair-like structures in the acervulus) in vitro occurs occasionally on PDA and generally on strawberry leaf agar. The setae are dark brown, short, thick-walled, non-septate and taper to the apex, averaging 50 x 3 μ . The other anthracnose fungi *C. fragariae* and *C. gloeosporioides* are fast-growing (3 cm dia./3 days) usually producing grey-green darker mycelium with salmon to apricot-colored conidia. The conidia of *C. fragariae* are pointed at one end (obclavate) averaging 18 x 4 μ and those of *C. gloeosporioides* are rounded at both ends averaging 15 x 4.5 μ . The setae for both species are longer and multiseptate, averaging 100-120 x 3.5-4.5 μ .

Strawberry anthracnose is generally not harmful to fruit production in California. However, there is a potential risk of significant losses in the coastal production fields due to foggy or rainy conditions. Devastating losses of strawberry crops in the Watsonville area occurred between 1986 and 1987, during a severe epidemic of anthracnose disease.

Control measures for anthracnose begin with early detection of the initial stages of the disease in the fall before harvesting, and the use of disease free planting stock. Intensified surveys concentrating on collapsed plants in the summer, followed by inspection of the runners and fruit in the fall (beginning in September), expedite disease identification. Hot water dip treatments prior to planting and use of clean planting stock eliminate inoculum sources and help reduce severe disease outbreaks and crop losses.

References:

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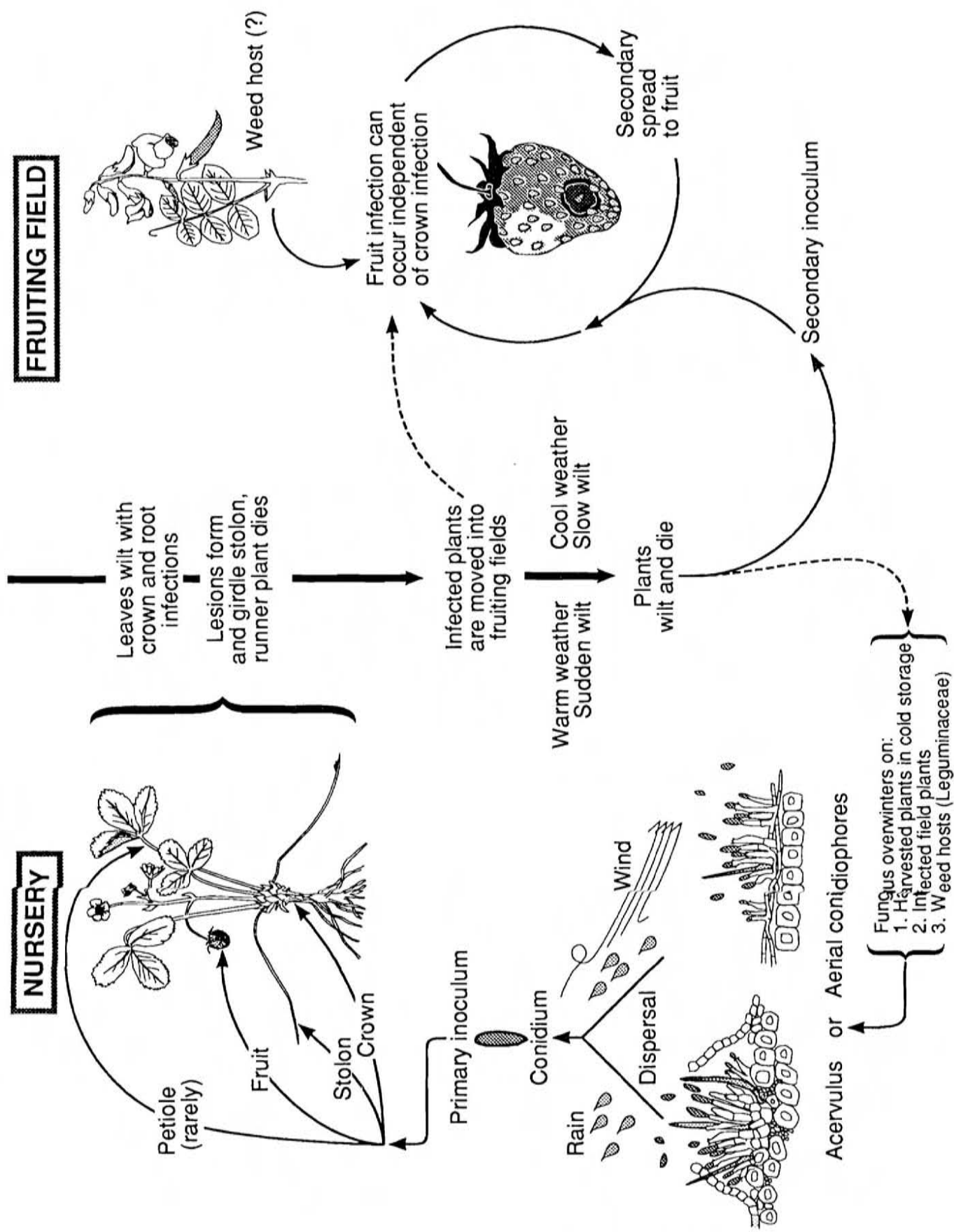


Fig. 4 Disease cycle of strawberry anthracnose, caused by *Colletotrichum acutatum*.
(Adapted from original drawing by M. Finney in the Compendium of Strawberry Diseases by permission of APS)